

Fourmile Vegetation Management Project
Environmental Assessment
Forest, Oneida, and Vilas Counties, Wisconsin

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Note: All appendices and maps are separate documents, spreadsheets, or pdfs to facilitate downloading of large files and different types of files.

Appendix A – Stand List with Activities

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Eagle River-Florence Ranger District of the Chequamegon-Nicolet National Forest (referred to as the Forest) proposes to implement vegetation management activities collectively referred to as the Fourmile Vegetation Management project. The project is located in the southwest portion of the Eagle River-Florence Ranger District, in portions of Oneida, Vilas, and Forest Counties, Wisconsin.

This Environmental Assessment (EA) package has been prepared for a 30-day Notice and Comment period. This is conducted to seek additional input on the proposal and potential effects. This information package is your opportunity to review our proposed action and provide comments that might guide us in the completion of an environmental analysis document for the Fourmile Vegetation Management project. Input from the public was provided during scoping and has been considered in developing this draft EA. The final EA will be developed after consideration of the comments received.

The purpose and need of the Fourmile Vegetation Management Project is to maintain and manage vegetation communities to their desired conditions as described in the 2004 Chequamegon-Nicolet Forest Land and Resource Management Plan (referred to as the Forest Plan). This project will also maintain or enhance existing forest research studies; contribute toward satisfying demand for wood products; provide a safe and effective road system; increase public safety related to wildfire potential; and maintain or enhance recreation experiences.

Two alternatives were analyzed in detail, including the No Action alternative (Alternative 1) and the Proposed Action alternative (Alternative 2). Under Alternative 1, the proposed actions would not be implemented, although ongoing projects and activities would continue. Alternative 2, the Proposed Action, meets the purpose and need with actions on around 12,100 acres of timber harvest, 562 acres of fuel reduction pertaining to wildfire probability and reforestation, 6.5 miles of hunting hiking trails maintenance, 1.2 miles of new road construction, 0.2 mile temporary road construction, 46.4 miles of road reconstruction, 1.0 mile of National Forest System Road closure and removal from Motor Vehicle Use Map (MVUM), 50.7 miles of unauthorized roads added to the National Forest Transportation System as closed to public motor vehicle use, 0.9 mile of unauthorized roads added to the system as open to public motor vehicle use and added to the MVUM, 48.9 miles of road converted to trail, and 147.2 miles of road decommissioning.

This analysis determined that there would be minimal adverse effects to the physical, biological, and economic environments under the action alternative with the implementation of management requirements and mitigation measures.

This EA incorporates by reference the project record that contains technical resource reports prepared by resource specialists, in addition to other information such as maps, field notes, spreadsheets, and Geographical Information System (GIS) information. Relying upon the project record helps to implement the CEQ regulation provision that Federal agencies should reduce the paperwork related to National Environmental Policy Act (NEPA) process (40 CFR 1500.4).

This draft environmental assessment (EA) tiers to the broader, more detailed analysis of the Forest Plan and its Final Environmental Impact Statement (USDA Forest Service, 2004), hereafter referred to as the Forest Plan FEIS. This project EA discloses the direct, indirect, and cumulative impacts that would result from the proposed action and alternatives. The Forest

Service has prepared this draft environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and its implementing regulations at 40 CFR Parts 1500-1508, and other relevant federal and state laws and regulations.

This document is available on the internet at: <https://www.fs.usda.gov/project/?project=51959>.

1.2 Project Area Description

The Fourmile Vegetation Management project area (hereafter referred to as the Fourmile project area or project area) lies within the southwest portion of the Eagle River-Florence Ranger District in portions of Oneida, Vilas, and Forest Counties. The activities are within legal description: T40N, R11E and R12E; T39N, R11E and R12E; and T38N, R11E and R12E. A general vicinity map is located after the cover page and before the table of contents in this environmental analysis. The project area encompasses more than 55,000 acres, of which roughly 44,000 acres are a part of the Chequamegon-Nicolet National Forest.

Forest Road (FR) 2178 (Military Road), FR 2183 (Scott Lake Road), and Highway 32 run through the project area. There are many other roads that wind through the project area as well, providing scenic drives and recreation opportunities. The forest composition in the project area is dominated by mixed hardwoods, aspen, and red pine with minor components of lowland conifer, like black spruce. Larger-sized lakes in the project area include Franklin, Lower Ninemile, Sevenmile, Big Fork, Julia, and Whitefish Lakes.

The Forest Plan establishes multiple-use goals and objectives, and assigns a Management Area (MA) to each block of forest, based on various combinations of Landscape Type Association, forest type, geographic boundaries (e.g. roads, rivers, land ownership boundaries), or political boundaries. The proposed actions for the Fourmile project area include five MAs: 2A; 2B; 4A; 4B; and 8A.

MA 2A: The direction for MA 2A (Uneven-aged Northern Hardwoods Forest) emphasizes large patches of uneven-aged hardwood forest that is maintained through selection cutting and creation of canopy gaps that occur at 10 to 20-year intervals. Pine and early-successional types are present and should be maintained with even-aged silviculture. Temporary open patches are small, somewhat uncommon, and normally do not break up large patches of northern hardwoods. Forest openings are generally allowed to revegetate, but a small number of openings are maintained as openings (Forest Plan at 3-7 through 3-8). Eleven percent of the project area's NFS (National Forest System) lands is in MA 2A.

MA 2B: (Uneven-aged Northern Hardwoods Interior Forest) features a similar forest structure and has the same desired conditions as MA 2A. However, this management area will have less aspen and pine, leading to more pure hardwood stands. Twelve percent of the project area's NFS lands is in MA 2B.

MA 4A: (Conifer: Red – White – Jack Pine) is dominated by conifer, but hardwood and aspen are well represented. These ecosystems are maintained by even-aged timber harvesting (thinning, shelterwood, and clearcutting harvests), site preparation, and prescribed fire. Young forests, small permanent openings, and mixed stands of pine-oak are commonly interspersed throughout the area (Forest Plan at 3-17 through 3-18). Seventeen percent of the project area (National Forest System lands) is in MA 4A.

MA 4B: (Conifer: Natural Pine-Oak) is dominated by natural origin red and white pine often mixed with oak. Early successional forest, such as aspen, is a minor component of the area. Timber harvest along with fire is used to regenerate pine and oak. Low intensity intermediate treatments such as thinning and prescribed fire are scheduled on a return interval of 10 to 20

years (Forest Plan at 3-18 through 3-19). Twenty-three percent of the project area's NFS lands is in MA 4B.

MA 8A: (Argonne Experimental Forest [AEF]) is one of only approximately 80 USDA Forest Service experimental lands. Relatively continuous mid to late successional northern hardwood and northern hardwood-hemlock forests dominate the southern and eastern portion of the Argonne Experimental Forest. Early successional types such as aspen, balsam fir, and jack/red pine dominate the northern and western portion of the area. Temporary openings resulting from research projects are generally small (5 to 40 acres), but may vary as projects expand to consider landscape level effects (Forest Plan at 3-36 through 3-38). Fourteen percent of the project area's NFS lands is in MA 8A.

There are proposed actions within this project area that are bordering, but not within, MA 8E (Research Natural Area [RNA]). All stands being proposed near RNAs or MA 8Es are aligned with the guidelines of MA 8E while meeting the Forest Plan guidelines of their respective management area (Forest Plan at 3-50 through 3-53).

The remaining twenty-three percent of NFS lands in the Fourmile project area consist of MA 6A, 8D, 8E, 8F, and 8G. Since the proposed activities are not located in these areas, a description of these MAs will not be supplied here. However, for a detailed description of these MAs, see the Forest Plan at 3-30 through 3-32 and 3-42 through 3-59.

1.3 Purpose and Need for Action

The Forest is tasked with implementing land management activities consistent with direction in the Forest Plan and addressing major gaps between desired future conditions and the current conditions in the project area.

In early 2017, an interdisciplinary team comprised of District and Forest resource specialists began assessing the existing conditions and management options within the Fourmile project area. The purpose and need for this project was developed when these resource specialists identified the specific gaps between desired conditions (outlined in the Forest Plan) and ground conditions within the project area. In addition, a detailed roads analysis was completed in order to determine long-term access needs.

The proposed action (Alternative 2) was derived from these efforts, reflecting how the Forest Service could best close the gap between the desired and existing conditions, while meeting project objectives and eliminating or minimizing potential resource impacts. Alternative 2 actions or activities are described in Chapter 2.

Vegetation management was identified as the main focus of this project. All of the vegetation needs identified by resource specialists are tied to Goal 1.4 of the Forest Plan: provide terrestrial ecosystems in healthy, diverse, and productive conditions that support the diversity of plant and animal communities and tree species, and have a high likelihood of supporting the viability of native and desired non-native vertebrates and vascular plants well distributed in their ranges within the planning area over time (Forest Plan at 1-3). The proposed project also includes transportation management, wildfire and fuels management, and management of hunter hiking trails and wildlife openings.

Through examination of the existing conditions in the project area, five major purposes and nine needs for action have been identified based upon Forest Plan goals and objectives and other Forest Service direction. To achieve those purposes, the Proposed Action would reduce stocking levels and maintain or enhance uneven-aged stand conditions. The proposal would also improve tree species diversity within stands, provide more data for long-term research

projects, and make improvements to wildlife habitat, recreation assets, and the transportation system. Appendix D contain more details related to the purpose and the need for the project.

Purpose A. Maintain or restore vegetation communities to their desired conditions in Management Areas (MA) 2A, 2B, 4A, 4B, and 8A (Forest Plan Objective 1.4a).

- Need 1. Reduce stocking levels in overstocked forested stands within Management Area 2A, 2B, 4A, 4B, and 8A.
- Need 2. Maintain or move northern hardwood stands toward an uneven-aged condition consistent with Forest Plan direction while maintaining or enhancing within stand species diversity.
- Need 3. Improve age class distribution, moving stands toward Forest Plan desired conditions.
- Need 4. Improve tree species composition to more closely reflect Forest Plan desired conditions.
- Need 5. Maintain or enhance existing forest research studies (e.g. continue research studies in the Argonne Experimental Forest or develop new research studies) to address vegetation concerns.

Purpose B. Contribute toward satisfying demand for wood products and special forest products through environmentally responsible harvest on National Forest System lands (Forest Plan Objective 2.5).

- Need 6. Utilize commercial harvest as the preferred tool to achieve project objectives, contributing to the demand for forest products.

Purpose C. Need to provide a safe and effective road system (Forest Plan Goal 3.1).

- Need 7. Build and maintain safe, efficient, and effective infrastructure that supports public and administrative uses of National Forest System lands.

Purpose D. Increase public safety related to wildfire potential (Forest Plan Objective 2.8c).

- Need 8. Reduce hazardous fuels within communities at risk.

Purpose E. Maintain or enhance the diversity and quality of recreation experiences within acceptable limits of change to ecosystem stability and condition (Forest Plan Goal 2.1).

- Need 9. Maintain the Scott Creek, Kimball Creek, and Nine-Mile hunter hiking trail (HHT) and associated wildlife openings.

1.4 Decision Framework

This EA is not a decision document. Its main purpose is to disclose the potential impacts of implementing the proposed action and alternatives to that action so that the Responsible Official, the Eagle River-Florence District Ranger, can make an informed decision. Options include implementing the project as proposed through the selection of one of the alternatives (including the No Action alternative), or through a combination of analyzed alternatives. The Responsible Official will answer the following three questions:

1. Will the proposed action proceed as proposed, as modified by an alternative, or not at all?
2. What mitigation measures or project design criteria and monitoring requirements are needed?

3. Will the decision require a Forest Plan amendment?

1.5 Consultation and Public Involvement

Local tribes, concerned agencies, local governments, and the general public were consulted with or notified about this project during the early stages of project development. Opportunities to provide comments regarding this proposed project were provided through consultation letters, scoping packages, a legal notice in the Newspaper of Record (*The Northwoods River News*, Rhinelander, WI), the Chequamegon-Nicolet National Forest quarterly Schedule of Proposed Actions (SOPA), and the Forest's web page (<https://www.fs.usda.gov/project/?project=51959>).

Communication will continue throughout the finalization of this analysis and a final project decision. Opportunities to provide comments regarding this proposed project were provided through the processes summarized below.

- Twelve local tribal representatives were contacted on June 15, 2017.
- Public notification has been on the Forest's project web page since June 2017.
- This project has been listed in the CNNF Quarterly Schedule of Proposed Actions (SOPA) beginning with the September 2017 edition.
- On June 15, 2017, a scoping letter (including where additional project information could be found) was sent (hard copy or by email) to 867 interested publics, adjacent landowners, organizations, and government agencies.

122 comments or responses were received during the scoping period (June 15 – July 17, 2017). Summaries of the comments and Forest Service responses to them are in the project record and in Appendix C of this EA.

The next formal comment period, a 30-day period, will begin with the publication of a legal notice in the newspaper of record, *The Northwoods River News*, of Rhinelander, WI. The legal notice will announce the availability of this document and associated maps and tables.

1.6 Issues and Concerns

Issues are those subjects directly or indirectly impacted by implementing the proposed action. They are used in the analyses to disclose effects, prescribe mitigation measures, or to formulate alternatives to the proposed action. The Council on Environmental Quality regulations require this delineation in Section 1501.7 "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Section 1506.3)..."

Appendix C includes comments received from the initial June, 2017 scoping period, along with Forest Service responses to public concerns. Some comments were not identified as issues because they were: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decisions; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific or factual evidence; or 5) the magnitude, extent, duration, speed, and/or direction of effects relating to the issue were considered to be insignificant.

The results of internal scoping, tribal consultation, and public involvement were reviewed by the interdisciplinary team and the following relevant issues were identified. For each issue, there is a description of how it relates to the proposed action (cause and effect relationship) and how it is measured in the analysis. More complete issue descriptions for each associated resource are provided in resource reports in the project record.

- Threatened and Endangered Plant Species (TES), and Regional Forester Sensitive Plant Species (RFSS)
- Visuals or Scenic Integrity
- Tree Composition (species and age diversity)
- Non-native Invasive Species (NNIS)
- Fuels, Prescribed Burning

Additional public concerns surfaced around game species (deer, grouse, and bear), general herbicide use, aspen management and clearcutting, early successional (wildlife species management), road access management, road improvement, trail use changes, project purpose and need, quality loggers/implementation personnel, and implementation timeline. These topics were responded to in Appendix C, Response to Comments. In addition to the issues, the following resource areas for analysis are addressed:

- Soil Productivity
- Water Quality
- Air Quality
- Transportation and Public Access
- Climate Change

CHAPTER 2 – ALTERNATIVES

The purpose and need for action defines the range of alternatives since all alternatives must in some way meet the purpose and need. Alternatives to the proposed action are usually developed to address unresolved significant issues about effects identified during scoping. 36 CFR 220.7(b)(2) states that an EA shall briefly describe the proposed action and alternatives that meet the need for action. No specific number of alternatives are required or prescribed.

This chapter, along with Chapter 3, Affected Environment and Environmental Consequences, provides the basis for the Responsible Official and the public to compare alternatives. Chapter 2 describes the No Action Alternative (Alternative 1) and the action alternative (Alternative 2) that wholly or partially meets the purpose and need identified in Chapter 1. The formulation of alternatives complies with the implementing regulations of NEPA (36 CFR 220.7(b)(2)), which state that the EA shall briefly describe the proposed action and alternatives that meet the need for action and address an issue.

2.1 Alternative 1 – No Action

The No Action alternative is analyzed in order to provide a baseline of the environmental condition if no additional agency action is undertaken. This alternative does not respond to the purpose and need of addressing Forest Plan goals and objectives.

Under this alternative, no timber harvesting, fuel reduction, trail maintenance, or road decommissioning would be implemented to accomplish project objectives. However, current ongoing management and permitted uses would continue in the project area and across the District, including road maintenance, wildland fire suppression, and recreation facility maintenance. Public uses such as camping, firewood gathering, and hunting would also continue. The results of taking no action compared to the other alternative are displayed in the tables at the end of this chapter, and in the individual resource analysis sections of Chapter 3.

2.2 Alternative 2 – Proposed Action

This alternative was developed to maximize attainment of the purpose and need while meeting agency and Forest Plan requirements. It emphasizes moving the project area toward Forest Plan desired conditions.

Appendix A includes tables of proposed vegetation management, fuels treatments, trail maintenance, and transportation actions for each stand in Alternative 2. The amount of a particular activity outlined in Appendix A (acres and miles), and the locations depicted on maps in Appendix I are approximate based on inventory and survey estimates. The vegetation management table displays stand acres for each stand; these acres may be adjusted due to on-the-ground conditions at the time of implementation. Typically, the on-the-ground conditions will reduce the actual activity acres. In some cases, the implemented stand acres are less than the stand acres in order to protect water, fish, wildlife, plants, or because a particular portion of the stand does not lend itself to the proposed silvicultural treatment. The actual figures could change during preparation for a timber sale based on such things as avoidance of site-specific areas that are too small to show up at the scale of maps used for display, small inclusions of inoperable terrain, non-uniform stand structure, or slight refinements in the amount of road construction or reconstruction that may be needed.

Table EA-1 below shows the number of acres of various treatments for different tree species.

Table EA-1. Vegetation treatment acres by species

Treatment	Aspen	Balsam Fir	White Pine	Hardwood / Hemlock	Jack Pine	Red Oak	Paper Birch	Red Pine	White Spruce	Total
Removal	45	166	16	5	0	0	0	0	0	232
Clearcut/Coppice	1,053	73	0	37	13	0	0	8	6	1,190
Improvement	0	0	0	263	0	0	0	0	0	263
Selection	0	0	0	5,130	0	39	0	0	0	5,249
Shelterwood	0	0	42	0	17	84	253	6	0	403
Thin	186	11	407	43	11	98	139	2,325	193	3,331
Restoration	25	0	0	0	4	4	0	147	0	181
Salvage/Sanitation	27	0	13	0	33	114	0	0	40	227
Pre-Commercial Thin	0	0	29	0	0	0	0	63	0	92
Experiments	0	0	0	526	0	0	0	0	0	526
Total	1,336	250	507	5,979	78	339	392	2,549	239	11,669

See Appendix E for more information on: road decommissioning; road closures; road reconstruction or maintenance; road construction; trail conversion; fuels reduction; maintenance of hunter hiking trails and wildlife openings; and research.

Variation of Forest Plan guideline for created openings greater than 40 acres

Alternative 2 includes a minor variation from a Forest Plan guideline (i.e. clearcutting over 40 acres). This variation would not require a Forest Plan amendment.

Specifically, there are eight aspen or mixed aspen, paper birch, and balsam fir stands that would be combined to create harvest units greater than 40 acres in size (see Table EA-2). These forest stands need harvest treatment to meet the purpose and need of this project. To ensure the Forest Service minimizes forest fragmentation (maintain forest connectivity) and still resolves the issue of forest resiliency in the Fourmile project area, it is necessary to create temporary openings that exceed 40 acres in certain areas. The Forest is allowed to create temporary openings greater than 40 acres after project level analysis, 60 days of public notice, and review and approval by the Regional Forester.

Table EA-2 below gives information about these 8 stands. These stands total 351 acres and average approximately 44 acres in size, with the largest stand measuring 124 acres. 124 acres are in Management Area 2A, 49 acres in 4A, and 178 acres in 4B.

Table EA-2. Aspen units proposed for clearcut harvests greater than 40 acres

Stand ID	Acres*	MA	BA**	DBH	Age
2189-14	49	4A	153	10	40
2211-5	124	2A	-	-	45
2219-13	102	4B	129	9	49
2218-20*	5	4B	133	10	52
2218-30*	27	4B	100	8	42
2218-31*	10	4B	127	10	57
2218-41*	26	4B	107	10	62
2218-35*	8	4B	160	10	42

* Stands smaller than 40 acres are included in this list because they border each other, creating an opening larger than 40 acres.

** BA = basal area

Deviating from the Forest Plan guidance of no clearcutting over 40 acres is being pursued to treat over mature aspen, increase forest health, and meet Forest Plan desired future conditions. This treatment would retain aspen populations at a level which is prescribed in the Forest Plan (i.e. lower amounts of older, dying aspen, and increase younger aspen that is beneficial for many wildlife species like ruffed grouse and golden-winged warbler). For the Fourmile project, clearcutting these areas would meet the need to promote healthy aspen stands and aid in moving the project area's age class distribution toward Forest Plan desired conditions.

The effects of this Forest Plan guideline deviation are described in the vegetation section, Section 3.4 of this EA, under the analysis of Alternative 2. Also, throughout Chapter 3 of the EA, effects to other resources like wildlife, soils, and recreation are outlined; more detail is contained in the resource reports in the project record.

If the Forest Service were not able to deviate from this guideline, these large clearcuts would be sub-divided by approximately 10-acre leave areas or aspen shelterwoods (underplanting white pine for regeneration). These leave areas would add up to approximately 60 acres.

Red Pine Plantations – Potential Alternative Treatment

Many red pine plantations within this project area were planted by the Civilian Conservation Corp (CCC). This effort was to help reforest the landscape after the great cut over in the late 1800s and early 1900s. Many of these plantations were not placed in areas typically known for red pine; however, since red pine was easy to plant, cheap, and readily available, this was the primary species planted. When red pine is planted on sites where it normally doesn't grow, it tends to grow poorly and be less resilient to insect and disease issues. Due to this issue, some red pine plantations will need to receive their final harvest within the Fourmile project area.

If the silviculturist feels that the best course of action is to regenerate the stand, they will recommend that change to the interdisciplinary team. This change in prescription may occur on as many as 1,327 acres of red pine stands within the project area. This number was determined based on the number of red pine stands, over the age of 80, within the Fourmile project area that Alternative 2 proposes receive a thinning treatment.

Table EA-3. Range of red pine age class distribution

Range of Potential Red Pine Age Class Distribution within the Fourmile Project Area				
Red Pine Age Class	Desired Condition	Existing Condition	After Alternative 2 Implemented Condition	If all Red Pine stands over 80 (that were in the original proposed action) received a final harvest**
0-20	10-20%	1%	6%	40%
21-60	25-35%	32%	31%	31%
61-100	25-35%	52%	50%	16%
101+	20-30%	14%	13%	13%

** These numbers are based on what would occur if all red pine stands over age 80, in the proposed action, would receive a final harvest. This scenario is extremely unlikely.

2.2.1 Purpose and Need Connection to Proposed Action

The following actions were designed to move the project area toward desired conditions while meeting Forest Plan goals, objectives, standards, and guidelines. See Appendix A for a stands

list and Appendix I for maps. Appendix E contains descriptions and locations of the proposed activities. Appendix G includes information about the various types of vegetation treatments.

The following table displays the proposed action items and what needs they achieve.

Table EA-4. *Proposed Action (Alternative 2) and What 'Need' They Achieve	
Need 1: Reduce stocking levels in overstocked forested stands	Acres
Hardwood Forests	6,004
Conifer Forests (thinned)	3,496
Paper Birch Forests (thinned)	139
Need 2: Maintain or move northern hardwoods toward an uneven-aged condition while maintaining or enhancing within stand species diversity	Acres
Selection/Improvement Harvest	5,433
Canopy Gaps Created	5,169
Need 3: Improve the age class distribution	Acres
Change Aspen Age Class	3,590
Change Oak Age Class	242
Change Birch Age Class	253
Change Conifer Age Class	645
Need 4: Improve tree species composition	Percent
Change in Aspen Forest	-4%
Change in Balsam Fir Forest	-1%
Change in Paper Birch Forest	-29%
Change in Jack Pine Forest	-1%
Change in Red/White Pine Forest	+4%
Change in Hardwood Forest	+4%
Change in Oak Forest	+5%
Change in Spruce Forest	-1%
Need 5: Initiate, maintain, or enhance forest research studies in the project area	Count
# of Studies Continuing	4 (~790 acres)
Need 6: Utilize Commercial Harvest as the Preferred Tool to Achieve Project Objectives	MMBF
Timber Volume Offered	45.8
Need 7: Build and maintain safe, efficient, and effective infrastructure that supports public and administrative uses of National Forest System lands	Miles
New Road Construction	1.2
Road Reconstruction	46.4
Road Decommission (currently closed)	146.9
Road Decommission (currently open)	0.3
Road Conversion to Trail	48.9
Close to Public, Remove from MVUM	1.0
Open to Public, Add to MVUM	0.9

Table EA-4. *Proposed Action (Alternative 2) and What 'Need' They Achieve	
Add Road to System, Not to MVUM (for Non-motorized or Administrative Use)	50.7
Need 8: Reduce hazardous fuels within communities at risk	Acres
Ladder Fuel Reduction	229
Prescribed Burning for Regeneration or Restoration Purposes	334
Need 9: Maintain the Scott Creek, Kimball Creek, and Nine-mile Hunter Hiking Trails and Associated Wildlife Openings	
Trails Maintained	36.1 miles
Existing Openings Maintained	134 acres

* Definitions and descriptions of activities are contained in Appendix G – Glossary & Acronyms

See Appendix E for more information about: road construction; road decommissioning; road closure; road reconstruction or maintenance; trail conversion; fuels reduction; maintenance of hunter hiking trails and wildlife openings; and research activities.

2.3 Relevant Laws, Regulations, Policies, Management Requirements

The Forest Service has prepared this EA in compliance with National Environmental Policy Act and its implementing regulations at 40 CFR Parts 1500-1508. 36 CFR 220.7 (c)(5) states that a Finding of No Significant Impacts (FONSI) will outline findings required by other laws and regulations applicable to the decision at the time of the decision. This project will comply with applicable laws, executive orders, policies, and regulations, including, but not limited to:

- National Forest Management Act
- Chequamegon-Nicolet National Forest Land and Resource Management Plan (Forest Plan), 2004.
- Wisconsin's Forestry Best Management Practices for Water Quality (BMPs), 2010
- Endangered Species Act of 1973, as amended 1978, 1979, 1982, and 1988 (16 United States Code (U.S.C.) 1531)
- National Historic Preservation Act (16 U.S.C. 470)
- Clean Water Act, as amended 1977
- Wilderness Act
- Regional Forester Sensitive Species Policy
- Environmental Justice

For more information on the laws, regulations, and policies related to this project, see Appendix F – Compliance with Direction.

Applicable standards and guidelines from the Chequamegon-Nicolet Forest Plan are detailed in Appendix B, along with location or activity-specific design features and mitigation measures. These measures are part of the Proposed Action, and would be implemented with Alternative 2 to further reduce or eliminate undesirable effects to soil, RFSS, the spread of non-native invasive plant species, and impacts to other resources.

2.4 Alternatives Eliminated from Detailed Analysis

The Responsible Official, along with the help of the interdisciplinary team, found that one issue drove the Forest Service to look at an additional alternative to the initial proposed action. This issue included the concern around the impacts to Hidden Lake Trail and the visual resources in

close proximity to the trail. The Responsible Official determined this issue did not warrant further analysis in the environmental analysis because this alternative would not fully meet the purpose and need, would negatively impact the trail system in the long-term, and visual resources would already be mitigated with Forest Plan guidelines and project mitigations.

Hidden Lake Trail Alternative (reducing potential impacts to the recreation experience)

The public suggested a 1-mile buffer of the Hidden Lake Trail in order to minimize the Fourmile project's impacts. Executing a 1 mile, no activity buffer around the Hidden Lake Trail would eliminate over 2,100 acres from the approximately 12,000 acre proposed action (approx. 17%). Those stands would no longer meet the project's purpose or move stands toward Forest Plan desired conditions. Also, managing the tree resources near the Hidden Lake Trail is a balance of short-term impacts and long-term benefits. The short-term, visual impacts of uneven-aged tree management (removing individual trees but keeping the canopy intact) would last less than 5 years, but the forest left behind would be more resistant to insects and diseases, and be less prone to come down across the Hidden Lake Trail. Keeping the forests around the trail managed would create large, more aesthetically pleasing trees. This forest management would also improve safety and access, and reduce maintenance by reducing the probability of trees dying and falling across the trail. The decision maker is willing to trade the short-term impacts in turn for the long-term, more sustainable, trail benefits.

Lastly, the Forest Plan outlines direction that limits implementation activities to preserve visual resources for high Scenic Integrity Objectives (SIO) resources and activities that occur around them; the Hidden Lake Trail is one of these high SIO resources.

2.5 Comparison of the Alternatives

This section compares the alternatives in summary form. Table EA-5 displays the amount of each proposed activity by alternative. Table EA-6 compares how well each alternative meets the purpose and need based on the project objectives.

More discussion of effects is provided in Chapter 3 – Affected Environment and Environmental Consequences. In addition, the full analyses, including methods, assumptions, and literature utilized, are available in resource reports in the project record. These reports are available to the public upon request, but with specific exemptions to protect sensitive, private, or confidential records under the Federal Freedom of Information Act.

Table EA-5. Comparison of proposed activities by alternative

Activity	Alt. 1	*Alt. 2
<i>Harvest</i>		<i>Acres</i>
Selection Harvest	0	5,249
Thinning	0	3,249
Clearcut	0	1,190
Shelterwood	0	403
Improvement Harvest	0	263
Overstory Removal Harvest	0	232
Restoration Thin	0	181
Salvage/Sanitation Harvest	0	227
Experimental Harvest	0	526
Total Harvest	0	11,669
<i>Site Preparation and Regeneration</i>		<i>Acres</i>
Aspen Regeneration Site Preparation	0	966
Full Planting and Underplanting	0	647
Biochar Application	0	240

Activity	Alt. 1	*Alt. 2
Manual Site Preparation (e.g. canopy gaps)	0	5,249
Herbicide	0	37
Mechanical Scarification	0	352
Wildlife		
Hunter Hiking Trail (HHT) Maintenance (miles)	0	36.1
Wildlife Opening Maintenance Associated with HHT (acres)	0	134
Fuels Reduction		Acres
Ladder Fuel Reduction	0	229
Prescribed Burning for Regeneration or Restoration Purposes	0	334
Transportation		Miles
New Road Construction	0	1.2
Temporary Road Construction	0	0.2
Road Reconstruction	0	46.4
Decommission (currently closed)	0	146.9
Decommission (currently open)	0	0.3
Road Re-labeled to Trail	0	48.9
MVUM update – close road, remove from map	0	1.0
MVUM update – open road, add to map	0	0.9
Add Road to System, for Non-motorized or Administrative Use	0	50.7

*Note: Many units receive more than 1 treatment, therefore; adding up acres above would be double-counting some acres. The same is true for road mileages.

Table EA-6. Comparison of project needs by alternative

Need #	Measure	Alt. 1	Alt. 2
		Acre	Acres
1	Reduce Hardwood Forest Stocking	0	6,004
	Reduce Conifer Forest Stocking	0	3,496
	Reduce Paper Birch Forest Stocking	0	139
2	Selection/Improvement Harvest	0	5,433
	Canopy Gaps Created	0	5,169
3	Change Aspen Age Class	0	3,590
	Change Oak Age Class	0	242
	Change Birch Age Class	0	253
	Change Conifer Age Class	0	645
4	Change in Aspen Forest	0	-4%
	Change in Balsam Fir Forest	0	-1%
	Change in Paper Birch Forest	0	-29%
	Change in Jack Pine Forest	0	-1%
	Change in Red/White Pine Forest	0	+4%
	Change in Hardwood Forest	0	+4%
	Change in Oak Forest	0	+5%
	Change in Spruce Forest	0	-1%
5	# of Studies Continuing	0	4
6	Timber Volume (MMBF)	0	45.8
7	New Road Construction	0	1.2

Need #	Measure	Alt. 1	Alt. 2
		Acre	Acres
	Road Reconstruction	0	46.4
	Road Decommission (currently closed)	0	146.9
	Road Decommission (currently Open)	0	0.3
	Road Conversion to Trail	0	48.9
	Close to Public, Remove from MVUM	0	1.0
	Open to Public, Add to MVUM	0	0.9
	Add to Road System, Not to MVUM (for Non-motorized or Admin. Use)	0	50.7
8	Ladder Fuel Reduction	0	229
	Prescribed Burning for Regeneration Or Restoration Purposes	0	334
9	Trails Maintained (mi.)	0	36.1
	Existing Openings Maintained (acres)	0	134

2.6 Monitoring

Monitoring is the process of collecting data and information. Monitoring and evaluation is required by the National Forest Management Act regulations (CFR 219) and therefore formal monitoring is typically conducted at the Forest level. Monitoring is not performed on every single activity, nor does it need to be in order to meet the statistical rigor of formal research (Forest Plan at 4-1). In addition to the legally-required monitoring items discussed in Table 4-1 of the Forest Plan, the following monitoring would occur either during or after implementation of the proposed project activities.

- Tree marking would be monitored by the forest check cruiser and/or the district silviculturist to ensure the intent of the prescriptions are implemented on the ground.
- The timber sale administrator would inspect the harvest operations to make sure the contract provisions, management requirements, and mitigation measures are followed.
- During project implementation, on-site inspections would be performed by sale administrators to ensure contract provisions to protect soil resources are enforced. Annual timber sale implementation and effectiveness reviews are routinely conducted by interdisciplinary teams on randomly selected sale units. Also, annual soil quality standards monitoring would be conducted by a soil scientist on randomly selected timber sales across the Forest.
- All planted areas would be surveyed (survival survey) to monitor the establishment of the planted seedlings. All naturally regenerated areas would receive stocking surveys to monitor the success of natural regeneration in aspen clearcuts and hardwood selection harvests. Stands adjacent to trout streams would be surveyed to determine whether the harvest activities and/or underplanting resulted in a reduction of aspen regeneration.
- During project implementation, proposed treatment areas (harvest, site preparation, and road construction) would be monitored by Forest Service personnel to ensure contract specifications and design measures are followed. Randomly selected treatment areas would be monitored post-harvest by the forest soil scientist as part of a forest-wide soil monitoring program, to evaluate whether ground conditions meet acceptable limits of change for measurable and observable soil properties. Annual timber sale implementation

and effectiveness reviews, including effects to soils, are conducted across the Forest by interdisciplinary teams on randomly selected completed harvest units. Future reviews on the Eagle River-Florence District would most likely include treatment areas from the Fourmile project area.

- During harvest operations, stands would be monitored on a regular basis to ensure project design features are implemented and maintained.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the affected environment, or existing condition, of specific environmental components within the Fourmile project area that may be affected by proposed actions. The existing condition, combined with the description of activities of the no action alternative (Alternative 1), establish the baseline conditions against which the decision-maker or Responsible Official and the public can compare the potential effects of Alternative 2.

This chapter discloses the environmental consequences of implementing the alternatives described in Chapter 2, focusing on the project objectives and issues. Environmental consequences are the “impacts” or “effects” to forest resources. The important or relevant effects are emphasized, while less important effects are described briefly. The level of detail to which each resource effect is discussed depends upon the character of the resource and the scale of analysis necessary to display the effects for the Responsible Official. Additional detail may be found in the project record.

The analyses contained in this EA are based upon the best available science available at the time of completion. Effects analyses and documentation were conducted by resource specialists (see Section 4). Their resource reports are summarized here, and are available in their entirety in the project record.

3.1 Past, Present, and Reasonably Foreseeable Future Actions

This section describes relevant past, present, and reasonably foreseeable future actions as they relate to the Fourmile project area. Cumulative effects on a particular resource result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions that result in similar effects, regardless of what agency or person undertakes the other actions (40 CFR 1508.7 and 1508.8). The cumulative effects analysis builds upon the existing condition assessment by considering the incremental addition of direct and indirect effects of the proposed action as well as ongoing and reasonably foreseeable actions. If there are no additional effects from the Fourmile project, then there cannot be cumulative effects and each resources will state that if that is the case.

In the mid-1800s, northern Wisconsin forests were comprised of species such as maple, yellow birch, hemlock, white pine, fir, and cedar. Contrary to popular belief, the forests were not homogenous, expansive tracts of old growth forest; they included barrens, early successional forests of aspen and paper birch, and mature conifer and hardwood (Bourdo 1983). Far more important to the land management history of the Fourmile project area was the logging era of the 1800s and the subsequent farming and grazing through the early 1900s. Following the extensive harvesting of the area that is now the Chequamegon-Nicolet National Forest, the federal government enacted an aggressive program to reforest its lands, mostly with pine species. As a result, the majority of the Forest is comprised of mature or nearly mature stands of trees. There has been a reduction in the amount of hemlock and cedar since pre-settlement times. Their poor regeneration may be attributed to the need for burned or scarified seed beds.

Using the Forest Service’s Forest Activities (FACTs) database, it was determined that almost 18,900 acres of harvesting has occurred in the project area since 1975. The known activities include approximately 6,300 acres of thinning, approximately 3,600 acres of clearcuts, approximately 3,300 acres of selection harvests, roughly 400 acres of removal harvests, and roughly 3,000 acres of improvement harvests. The rest of the acres were treated with

shelterwood or salvage harvests. Very little harvesting has occurred in the last 10 years; before 2010, approximately 470 acres were harvested each year out of the project area.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. For example, past clearcut acres in aspen are reflected in the age classes displayed in Table EA-7. The other harvests have resulted in some of the current forest types and stand densities also displayed in that table's existing condition.

The Fourmile cumulative effects assessments follow CEQ direction using methodology described in Quinn, 2011. This methodology uses a catalog of past actions initially to define the affected area for cumulative effects, then focuses on quantitatively assessing the combined, present condition of a resource on which to add predictions of effects of the proposal and other foreseeable actions, regardless of ownership.

Reasonably foreseeable actions are those that had a developed proposed action as of April 2019 but would be implemented sometime after this analysis. Additional discussion of methodology on consideration of reasonably foreseeable actions is found in Quinn, 2011.

No additional vegetation management projects are planned for the reasonably foreseeable future within the Fourmile project area; however, as additional proposals become ripe for decision, they will be considered and combined in cumulative effects considerations. The 2004 Forest Plan programmatically considered the cumulative effects of future, yet not site-specifically defined actions.

The following table of past, present, and foreseeable actions (Table 3-1) is a project list that the resource specialists referred to during the drafting of their cumulative effects analyses. The pertinent projects and the added Fourmile impacts were then analyzed in their given resource sections of the resource reports in the project record.

Table EA-7. Past, present, and reasonably foreseeable Forest Service projects considered in the Fourmile project area

Project Names	Decision Year	Project Names	Decision Year
Eagle River-Florence District			
Morgan Lake	2017	Tipler North Fuels Reduction	2006
North Reservoir Salvage	2016	Spruce Decline II	2006
Grandma Lake Salvage	2016	Conifer Corner Thinning	2005
Phelps	2011	Argonne Old Growth Research	2005
Mister Burns II Salvage	2011	Chipmunk Thinning	2005
Grubhoe	2009	Creek Branch Thinning	2005
Jesse Spruce Salvage	2009	Fourmile Creek Thinning	2005
Tucker Salvage	2008	Pine Fork Thinning	2005
Fishel	2008	Schroeder Thinning	2005
Polecat Pine Thinning	2008	Chapel Pine Thinning	2005
Long Rail	2006	Flowage Thinning	2005
Northwest Howell	2006	Fourmile	Expected 2019
Lakewood-Laona District			
Spruce Decline I	2004	McCaslin	2003
Spruce Decline II	2006	Doubtfire Salvage	2014
Boulder	2007	Townsend	2018
Honey Creek Padus	2010	Quad County Salvage	2007
Lakewood Southeast	2013	Hardwood Biomass	2008
Lakewood-Laona Plantation II	2008	Flower Lake	2008

Project Names	Decision Year	Project Names	Decision Year
LKLN Early Successional	2019		
Great Divide District			
Black Torch	2018	Twentymile	2009
Cayuga	2009	Twin Ghost	2010
Pioneer Road Salvage	2014	Cheq. Red Pine Thinning	2016
Cheq. Salvage and Restoration	2015		
Medford-Park Falls District			
Camp Four	2009	Ice Age Blowdown	2011
Medford Aspen	2008	Chequamegon Red Pine	2016
Park Falls Hardwood	2012	2014 Red Pine Salvage	2014
Medford Aspen II	2017	Cheq. Salvage and Restoration	2015
Riley	2009	North Boundary Salvage	2016
Washburn			
Fishbone	2007	Greenwood	2019
Northwest Sands	2009	Red Pine Thinning	2011
Sunken Moose	2004	Twin Lakes Salvage and Restoration	2017
Cheq. Red Pine Thinning	2016		
Forest-wide			
Early Successional Habitat Improvement	2012		

Lands of Other Ownership

On the Eagle River-Florence District, there are approximately 248,835 acres of upland forest types. Within the approximately 55,000-acre Fourmile project area, approximately 24,300 acres are upland forest managed by the United States Forest Service, excluding water and urban areas that are not National Forest System lands. Almost half of the project area is owned privately. From the experience of the resource specialists, much of the private land in the Fourmile project area is recreational cabins. Comprehensive data on the private lands, including forest types, age structure, management history, and future plans are not reasonably available. Therefore, these lands were evaluated and categorized using aerial photo interpretation and remotely sensed data from 2005. The Forest digital landcover data on the lands of other ownerships was created using manual delineation and classification based primarily on 2005 NAIP imagery. The data created is a polygon feature class delineated through manual photo interpretation and assigned to one of 13 categories of landcover (St. Pierre, 2009). 2017 land management data from the Wisconsin DNR was also included in these data interpretations, verifying private and state vegetation management actions. More details about how this data was utilized in the environmental analysis is supplied in the resource sections throughout.

Habitat models used to estimate acres of suitable and unsuitable habitat for the various RFSS identified the amount of private lands in the various categories, but for analysis purposes, these acres were excluded from the models. Private lands were assumed to provide no suitable habitat, even though many parcels do. For this reason, the type of management on non-federal lands should not affect the total acres of suitable habitat within the cumulative effects area. It should be noted that even without including suitable habitat on other ownerships, habitat in the analysis area was not a limiting factor.

3.2 Threatened and Endangered Plant Species (TES), and Regional Forester Sensitive Plant Species (RFSS)

Issue: The proposed harvesting, site preparation, and road reconstruction and construction may decrease the viability of some plant TES and RFSS by temporarily reducing the amount of suitable habitat available to them.

This report analyzes how the proposed Fourmile Vegetation Management Project would affect Regional Forester Sensitive Species (RFSS) plants. All RFSS plants were initially considered for this analysis; however, detailed analysis were conducted for species confirmed or likely to occur in the project area and where there is potential to be impacted by the proposed action. Species analyzed in this report include Mingan moonwort (*Botrychium minganense*), little goblin moonwort (*B. mormo*), bluntlobe grapefern (*B. oneidense*), ternate grapefern (*B. rugulosum*), spreading woodfern (*Dryopteris expansa*), butternut (*Juglans cinerea*), and American ginseng (*Panax quinquefolius*).

Analyses differentiate between occupied habitat (direct effect) and unoccupied habitat (indirect effect). Direct effects occur to individual plants or when occupied habitat is made unsuitable. An indirect effect occurs when suitable habitat is made unsuitable. The analysis area for direct and indirect effects is the Fourmile project area. Cumulative effects are the impacts that result from the incremental impact of the proposed action when added to past, present, or reasonably foreseeable future actions. Cumulative effects are evaluated at hierarchical scales from the Fourmile project area up to the Eagle River-Florence Ranger District (ERFL RD) and up to the Nicolet land base. The Forest Service developed habitat models based on habitat characteristics and conservation assessments to analyze impacts to RFSS plants. Effects on habitat suitability vary depending on the proposed treatment and resulting effects to canopy closure.

There are no known occurrences of Mingan moonwort in the project area; therefore, there would be no direct effects. Occurrences of Mingan moonwort are probable within the project area. A short-term reduction in suitable unoccupied habitat occurs at all scales, then dissipates within five years. Undiscovered sites are at a higher risk of impact from mechanical disturbance in stands not harvested during frozen ground conditions.

There are two occurrences of little goblin moonwort in the project area; one occurrence is adjacent to a stand proposed for treatment. Direct effects to little goblin moonwort would be minimized due to design features; therefore, there would be no direct effects. A short-term reduction in suitable unoccupied habitat occurs, but dissipates within five years. Undiscovered sites are at a higher risk of impact from mechanical disturbance in stands not harvested during frozen ground conditions.

There are two occurrences of bluntlobe grapefern in the project area, one in a stand proposed for treatment. There are no direct effects to bluntlobe grapefern due to design features. A short-term reduction in suitable unoccupied habitat occurs, but dissipates within five years. Undiscovered sites are at a higher risk of impact from mechanical disturbance in stands not harvested during frozen ground conditions.

There is one occurrence of ternate grapefern in the project area adjacent to a stand proposed for treatment. Direct effects to the ternate grapefern and occupied habitat would be minimized due to the design features; therefore, there would be no direct or indirect effects.

There is one spreading woodfern in the project area in one stand that is not proposed for treatment. No project activities are proposed within occupied habitat or suitable unoccupied habitat; therefore, there would be no direct or indirect effects.

There are no known occurrences of butternut in the project area; therefore, there would be no direct effects on known trees. Occurrences of butternut are probable within the project area. During implementation, Forest Plan guidelines would be followed protecting undiscovered trees and suitable unoccupied habitat; therefore, there would be no indirect effects.

There are 18 American ginseng occurrences in the project area occurring in 11 stands, of which six are proposed for treatment. Although design features would be followed, there is a short-term direct impact to occupied habitat that dissipates within five years. A short-term reduction in suitable unoccupied habitat would occur, but would dissipate within five years. Undiscovered sites are at a higher risk of impact from mechanical disturbance in stands not harvested during frozen ground conditions.

3.3 Visuals or Scenic Integrity

Issue: Project activity may adversely impact recreation opportunities and resources with high to medium Scenic Integrity Objectives (SIOs). For example, seeing or hearing project activities may negatively impact Forest users in the Fourmile project area. Or, proposed activities/harvests may impact scenic integrity along recreation resources (e.g. Military Road and Hidden Lakes Trail system).

Alternative 2 was developed with the intent of restoring native vegetation communities while addressing wildlife habitat improvement, watershed restoration, hazardous fuels reduction and timber production. These objectives were designed to be implemented in a manner that would minimize the possible effects on visuals resulting from harvesting and other vegetation management treatments in the project area.

Scenic integrity indicates the degree of intactness and wholeness of the landscape character (Landscape Aesthetics: A Handbook for Scenery Management, page 7). The effects from these activities would be viewed as a change in the degree of intactness of the landscape character observed by users after the harvest is complete. The greatest amount of noticeable change to scenic integrity would occur directly after harvest from logging debris, site preparation activities, and changes in vegetation composition and structure. After a period of time, vegetation management activities would create additional diversity in the treated stands including large, mature trees. One of the desired conditions for high quality scenery is diversity of species, including large, mature trees.

Because of the mitigation measures incorporated into the prescription for stands within the Fourmile project area, impacts to scenic resources from management of federal lands, added to the impacts from development of private lands, is not expected to change the scenic character of the trails, recreation sites, waterbodies and roads, and would lead to an increase in aesthetic quality through the project area. In the first ten years post-treatment, openings in the forest created by management activity would be noticeable. Beyond ten years, these openings would re-vegetate through natural processes or by intentional planting and reseeding. Management of these stands may continue within or beyond ten years to release the longer lived species as they become established.

3.4 Tree Composition (Species and Age Diversity)

Issue: The project activities may not move tree composition toward Forest Plan desired future conditions as much as expected.

This section of the EA is a summary of the Forest Vegetation Resource Report. The Fourmile Proposed Action has the potential to modify the composition and structure of upland forest vegetation. For more detail about the vegetation management activities proposed, see the

Vegetation Resource Report in the project record. The report also discusses what effects the proposals would have on the upland vegetation within the project area now and in the future, specifically the effects on forest composition and structure. The report compares the anticipated changes in vegetation to the desired conditions given in the Chequamegon-Nicolet Forest Plan. It also identifies which alternative actions best respond to the Fourmile project's purpose of and need for action.

In comparing and analyzing the alternatives, the following are discussed:

- Vegetation Composition – measured by acres and percent of types by Management Area.
- Vegetation Age Class Distribution – measured by acres and percentages in each age class.
- Forest Plan Composition Objectives and Desired Age Class Distributions.
- Conversion of Northern Hardwood stands from even-aged to two aged or uneven-aged condition- measured in acres and percent by management area

These measures are important as they not only measure how well the action would achieve the purpose and need, but they are also important in determining movement toward or away from Forest Plan desired future conditions (DFCs).

The actions of timber harvests and planting are the key actions that would result in measurable effects to forest vegetation. Other related actions, such as site preparation, prescribed burning, and hand release of seedlings also affect forest vegetation, but in less measurable ways. All of these actions are considered in the Vegetation Resource Report and the results are discussed in the context of the Forest Plan DFCs.

In preparing this analysis, the existing condition of the vegetation within the Fourmile Project Area was summarized and all expected changes were identified, by alternative. These changes were added to or subtracted from the existing condition to arrive at the expected results. The results were displayed in the context of Forest Plan Management Area direction at the project, area, and Forest levels. With this information, it displayed which actions moved the area in the proper management direction, and to what degree. Past, current ongoing, and planned future activities and their potential impacts of management were considered to determine cumulative impacts.

A summary of findings are as follows:

- Alternative 2 used selection harvest and improvement harvests in northern hardwood to convert 5,433 acres to two-aged and uneven-aged stands. Alternative 1 (the no action alternative) converted no northern hardwood to two-aged or uneven-aged.
- Alternative 2 would convert 503 acres of the Fourmile project area forest types to more closely reflect Forest Plan guidance.
- Alternative 2 reduces the stocking levels of 9,639 acres of overstocked stands (by means of commercial thinning, selection cuts, and improvement cuts) within the Fourmile project area. Alternative 1 does not reduce stocking levels on any acreage.
- Alternative 2 would adjust 2,291 acres of overmature stands to a younger cohort which more closely reflects Forest Plan guidelines than Alternative 1.

3.5 Non-native Invasive Plants (NNIS)

This section analyzes how the proposed actions and connected actions in the Fourmile Vegetation Management project would affect the introduction, establishment, spread, and

persistence of Non-Native Invasive Plant (NNIP) species. Direct effects are measured by the proximity of proposed activities to NNIP infestations (within ¼ mile) and travel through infestations. Indirect effects are measured by soil disturbance (acres) and light availability (acres) resulting from the proposed activities. The analysis area for direct and indirect effects is the Fourmile project area. Cumulative effects are measured by the amount and/or percent of soil disturbance (acres), light availability (acres) and net change in roads (miles) from the proposed activities in conjunction with other past, present, and reasonably foreseeable projects that overlap at a given scale. The scale used to analyze and compare cumulative effects are the Fourmile project area and the Eagle River-Florence Ranger District.

Within the Fourmile project area, there are 467 recorded invasive species infestations comprised of 16 different species totaling 443 infested acres (2,214 gross acres). Excluding stands with winter only harvest restrictions, there are 140 stands totaling 4,452 acres (38.1% of proposed stands) proposed for treatment in Alternative 2 infested with NNIP that have an elevated risk of NNIP spread. And an additional 210 stands totaling 3,289 acres (28.1% of proposed stands) proposed for treatment in Alternative 2 are within ¼ mile of documented NNIP infestations and have an elevated risk of NNIP introduction (stands with winter only harvest restrictions have been excluded).

There are 45.9 miles of proposed road actions in the Fourmile project area that contain or are adjacent to documented NNIP infestations and have an elevated risk of NNIP spread. An additional 108.0 miles of proposed road actions are within ¼ mile of documented NNIP infestations and have an elevated risk of NNIP introduction. The Fourmile project proposes a net reduction of roads in the project area by 145.8 miles, reducing the risk of NNIP spread by vehicle vectors.

Alternative 2 proposes to treat 5,285 acres in 173 stands that would have a negligible canopy effect, resulting in a slight risk of establishment and persistence of shade intolerant NNIP. 4,173 acres in 202 stands are proposed for treatment that would have a short-term canopy effect (\leq five years), resulting in an increased risk of establishment and persistence of both shade intolerant and intolerant NNIP. And 2,237 acres in 135 stands are proposed for treatment that would have a long-term canopy effect (\geq 50 years) resulting in a high risk of establishment and persistence of shade intolerant NNIP. The total soil disturbance caused by proposed treatments (1,551 acres) and road activities (89 acres) in Alternative 2 is 1,640 acres, which is approximately 3.7% of all NFS lands in the Fourmile project area. The risk of establishment, persistence, and spread of NNIP would be increased in these areas.

Alternative 2 results in 3.7% more cumulative soil disturbance in the Fourmile project area and 0.5% more total soil disturbance in the ER-FL RD when compared to Alternative 1. The cumulative light availability as a result of the proposed activities in Alternative 2 increases by 14.6% in the Fourmile project area and 2.0% in the ER-FL RD when compared to Alternative 1. Light availability effects can be expected to last until canopy closure rebounds to 80% in five to 50 years. Cumulative road change as a result of the proposed activities in Alternative 2 is reduced by 35.0% in the Fourmile project area and 5.5% in the ER-FL RD when compared to Alternative 1. It is assumed that the net reduction in roads would halt motorized traffic, reducing the risk of NNIP spread by vehicle vectors. The effects of implementing Alternative 2 when added to the effects of past, present, and reasonably foreseeable actions are not expected to result in appreciable adverse cumulative effects relative to NNIP.

Given project implementation would follow Forest Plan standards and guidelines and specific design features, actual potential for NNIP spread, introduction, establishment, and persistence as a result of project actions is reduced. The activities in Alternative 2 are not anticipated to contribute to the direct spread or exceed a low risk of introduction of NNIP in the project area.

Without implementation of project design features, Alternative 2 would directly and indirectly increase the risk of spread and/or introduction of NNIP. Considering the extent of NNIP infestation in the Fourmile project area, the Forest Service would rely extensively on these standards, guidelines, and specific design features to minimize NNIP spread.

3.6 Fuels

This section of the EA (3.12) looks at how the Fourmile Project proposal would affect hazardous fuels and our ability to suppress a wildfire due to the development of homes on private lands, fire prone fuel types growing on sandy soils, and the high recreational use of the area. The Townships of Hiles and Three Lakes within the Eagle River-Florence Ranger District boundary have been identified as having a high risk for potential wildland fire. These areas were nationally recognized as such in the Federal Register as a 'Community-at-Risk' (Federal Register January 4, 2001). Treating stands as proposed would reduce the amount of fuel, resulting in lower fireline intensities that would allow for direct attack.

Hazardous fuels are of primary concern within the wildland-urban interface (WUI) where human life and property are at the greatest risk. There is a need to reduce hazardous fuels on federal lands adjacent to private homes and property in the Fourmile area in order to protect public safety, as well as reduce the risk of resource damage from wildfire. The proposed treatments of stands within the WUI incorporate fuels treatments to help defend private properties and structures. Additionally, the proposed action reduces the threat of a large, high-intensity wildfire.

Our ability to use ground resources to attack a wildfire depends on anticipated fire behavior related to fuel types. Standard fuel models are used to represent wildland fuel types according to quantity and size, i.e., fuel loading. The standard measure of fire behavior that gauges the ability of a resource to attack a fire is fireline intensity. The visual representation of fireline intensity is flame length. The rate of spread of a fire influences fireline intensity and indicates if fire suppression resources could successfully curtail the spread of a fire. Therefore, rate of spread and fireline intensity (flame length) are the measures chosen to evaluate the success of ground firefighting resources.

Past fire occurrence and weather data for the project area were analyzed to determine average and very high fire weather conditions. Fuel models were assigned to represent fuel types and fuel loading. After inputting the weather conditions, fire behavior prediction software was used to predict fire behavior outcomes for the assigned fuel models. These were compared with established fire suppression interpretations for the ability of different firefighting resources to attack a wildfire under intensifying fire conditions.

The proposed action would reduce fuel loadings on all treated sites such that fireline intensities would stay below the threshold, allowing for direct attack at the head of a wildfire by ground resources. With no action, stands within the project area would maintain fuel loadings sufficient to thwart any attempts to directly attack a wildfire using ground resources. The stands in the area not treated by the proposed action may still maintain heavy fuel loadings; however, the continuity of heavy fuels would be disrupted by the proposed treatments, relieving the threat of a large, high-intensity wildfire. Cumulatively, the fuels reduction within the proposed action would reduce the fuel loading and the likelihood of catastrophic wildfire sufficiently to enable ground resources to attack a wildfire in all stands determined to be a high fuel hazard in the WUI.

Firefighter and public safety will continue to be the first and foremost goal of the U.S. Forest Service. The proposed actions are considered high priority to further these goals.

With no action, the general health of federal lands within the project would continue to decline, increasing the wildland fire risk. Coupled with the increased risk for human-caused fires in the area, there is a need to treat the high risk stands within the project area. Within untreated stands, fireline intensities would closely approach or exceed the threshold and rates of spread would exceed fireline-building rates for ground resources in the conifer stands. Protection of private property and structures would be jeopardized and fire suppression efforts under very high fire weather conditions would be difficult to contain with initial attack resources.

The planned treatments would reduce fuel loadings on all treated sites such that fireline intensities would stay below the threshold, allowing for a safe direct attack at the head of a wildfire by ground resources. These proposed actions would ultimately reduce the likelihood of catastrophic wildfire both within and outside of the wildland-urban interface.

3.7 Threatened and Endangered Wildlife Species (TES), and Regional Forester Sensitive Wildlife Species (RFSS)

Issue: The proposed harvesting, site preparation, and road reconstruction and construction may decrease the viability of some wildlife TES and RFSS by temporarily reducing the amount of suitable habitat available to them.

The purpose of the Biological Evaluation is to review Forest Service activities for possible effects on endangered, threatened, proposed, or sensitive species (Forest Service Manual 2672.4). "Sensitive" species include "those plant and animal species identified by a Regional Forester for which population viability is a concern" (Forest Service Manual 2670.5). The Forest Service is responsible for protecting all federally proposed and listed species and the Regional Forester Sensitive Species (sensitive species). If any federally listed or proposed or sensitive species are observed in the project area prior to or during project implementation, the Biological Evaluation, project, and effects would be reviewed and potential mitigation measures identified if needed.

Biological Evaluation Determinations for Federally Listed Species

All federally listed species were considered for analysis in the Biological Evaluation; however, only those species with suitable habitat and at least a marginal potential of occurrence within the project area were analyzed in detail. The Biological Evaluation considered effects of the project on five federally listed species that were evaluated in detail.

Of the five evaluated in detail, it was found there would be "*no effect*" for four of them: rusty patched bumble bee; Kirtland warbler; Canada lynx; and Fassett's locoweed. The northern long-eared bat was the only species to have a determination of "*May affect, beneficial effect*". A summary of effect for those species that had a "may effect" determination are below. See the Biological Evaluation for a full analysis to support the determinations for all federally-listed species evaluated.

Northern Long-eared Bat: This federally listed bat species has a "*May affect, likely to adversely affect but not result in jeopardy*" determination.

There were no northern long-eared bats detected during surveys conducted in the project area. Populations or habitat of this threatened species would not be altered in a detrimental way from the implementation of any proposed activity. No known hibernacula or known maternity roosts occur within the project area. Disturbance or mortality to roosting bats could occur if an occupied roost tree is removed or damaged during project activities. Roosting bats may also experience temporary disturbance if they are present during these activities. Generally, disturbed bats can be expected to relocate to an alternate roost within their home range.

However, the likelihood of disturbing or removing an occupied roost is low given the amount of tree removal proposed by this project when compared to the available habitat within the Forest boundary.

The removal of trees from this project would have a temporary effect on the suitable habitat, as a majority of the treated stands would eventually become reforested. This would provide future suitable roosting habitat for northern long-eared bats once tree diameters exceed 3-inches diameter at breast height (dbh) within approximately 5 to 15 years. Further, every year suitable habitat is created from ingrowth of previously managed forest stands across the District and Forest as their diameter exceeds 3-inches dbh and they become 10 years old or older. Additionally, the forested stands adjacent to the proposed treatment stands would continue to provide potential roosting and foraging habitat. Required Forest Plan standards and guidelines, along with project design features created to support the implementation of these standards and guidelines, would mitigate the potential effects of project actions and reduce the potential for direct and indirect effects to the northern long-eared bat.

The cumulative effects for the northern long-eared bat are summarized in the “Northern Long-eared Bat Biological Assessment for the CNNF Batched Vegetation and Prescribed Fire/Fuels Reduction Management Projects (BVMP) 2003-2015” (pp. 15-18). Here it was determined that “there are 1,619,019 acres of potentially suitable summer roosting habitat inside the National Forest’s exterior boundary and an additional 1,555,693 acres of suitable habitat on state and private lands outside but within five miles of the National Forest boundary. This provides an estimated 3,174,712 acres of suitable northern long-eared bat summer roosting habitat on all lands within the Forest exterior boundary and within a five-mile buffer of the Forest exterior boundary. If all projects included in both the biological assessments for the Forest Batched Vegetation projects, vegetation projects proposed in the years since the Batched Vegetation projects, and this project were to occur simultaneously across this area, these actions would cumulatively affect 38% of all potentially suitable summer roosting northern long-eared bat habitat. In the Biological Opinion issued by the US Fish and Wildlife Service for the BVMP, they stated the overall cumulative effect will be to maintain a mosaic of forest types and ages with no indication that habitat for the bat will become limiting in the foreseeable future. The proposed activities that may adversely affect the northern long-eared bat are within the scope of activities covered by the US Fish and Wildlife Service’s Final 4(d) rule for the northern long-eared bat. Moreover, any incidental take that results from the proposed activities is exempt from Section 9 prohibitions of the Endangered Species Act because the Fourmile project would be implemented in compliance with the Final 4(d) rule’s conservation measures.

Biological Evaluation Determinations for Regional Forester Sensitive Species

All sensitive species were considered for analysis in the Biological Evaluation; however, only those species with suitable habitat and at least a marginal potential of occurrence within the project area were analyzed in detail. The Biological Evaluation considered effects of the project on 77 Regional Forester Sensitive Species, and 13 Likely-to-occur Regional Forester Sensitive Species. Eleven animal species were evaluated in detail.

Of those evaluated in detail, it was found there would be a “*no impact*” on the following sensitive species: gray wolf; monarch butterfly; spruce grouse; wood turtle; bald eagle; Connecticut warbler; black-backed woodpecker; and West Virginia white butterflies. A summary of effect for species that had a “*may effect*” determination are below. See the Biological Evaluation for a full analysis to support the determinations for all Regional Forester Sensitive Species evaluated.

Red-shouldered Hawk: This sensitive bird species has a “*May impact individuals, but not likely to cause a trend to Federal listing or loss of viability*” determination.

Red-shouldered hawks are uncommon visitors across most of the ER/FL RD with most occurrences being focused on the southern edge. There are no known nesting red-shouldered hawks in the project area. Also, there are no historic nesting territories in the project area (active in the past 10 years) and no new nests were found during the 2017 survey season. NHI data had no reports of red-shouldered hawks in the project area. Within the Four Mile project area, there are currently 15,217 acres that are considered suitable habitat for red-shouldered hawks. The effects of the proposed action at the time of implementation in the project area would be a reduction of suitable habitat of 14.7%. This reduction is due to selection cuts occurring in stands with a dbh \leq 10 inches (99%), and as a result, the canopy closure will be reduced below 80%. However, in 2025, five years post implementation, the canopy closure will return to \geq 80% and the stands will once again become suitable habitat. At this time, the total amount of suitable habitat in the project will return to pre-implementation amounts with only a 0.05% net loss. At the District level in 2025, the cumulative effect of the project with others and the ingrowth of habitat shows a slight increase in habitat. However, at the Nicolet landbase in 2020 and 2025, there is a reduction of suitable habitat of almost 3% and of 2% respectively. Additionally, there about 5,335 acres of suitable habitat on non-Forest Service lands within the project area and a 1-mile buffer surrounding the project area.

American Marten: This sensitive mammal species has a “*May impact individuals, but not likely to cause a trend to Federal listing or loss of viability*” determination.

American marten have been documented in the project area with a higher concentration in the northern section. The proposed management activities will have an impact to the availability of the suitable habitat throughout the project area. Approximately 18,192 acres are currently considered suitable habitat for marten within the project area. Immediately following implementation, there would be 19.3% loss of suitable habitat, and five years post-harvest there would still be a reduction in suitable habitat of approximately 3.6% in the project area. The 3.6% loss would be long-term as a result of treatments including clearcuts and shelterwood harvests within aspen and birch habitats. However, in 2025, increases in suitable habitat across the ER/FL District (5.5%) and the Nicolet landbase (6.2%) are expected. These increases would occur from the ingrowth of suitable aspen, paper birch, and northern hardwoods habitats.

Big Brown Bat, Little Brown Bat, and Tri-colored Bat: These sensitive species, and Wisconsin state threatened bat species, have a “*May impact individuals, but not likely to cause a trend to Federal listing or loss of viability*” determination.

Big brown and little brown bats were detected in the project area; however, no tri-colored bats were recorded. Populations or habitat for these species would not be altered in a detrimental way from the implementation of any activity. The Forest does not contain any known bat hibernacula and no known maternity roosts occur within the project area. The primary focus is for protecting and providing adequate roost sites, and foraging locations not only during the summer months, but also during the spring and fall migratory periods. Adverse effects could occur due to long-term disturbance or mortality to roosting bats if an occupied roost tree is removed or damaged during project activities. Bats may experience short-term disturbance from noise and human presence if they are present during project activities occurring outside the hibernation season. The response of many bats to such disturbance would likely be the abandonment of the immediate area and any roost sites they established. Forested stands adjacent to the proposed treatment stands, and outside the project area would continue to provide potential roosting and foraging habitat for these bats. Because forest bats are expected to have several alternate roosts within their range, it is expected that they would be able to move to an alternate roost, and would not have to expend energy searching for new ones. Primary maternity roosts with non-volant (flightless) young (approximately June 1 to August 31) may be particularly vulnerable to disturbance, which could lead to abandonment for the entire

season or death of non-volant young roosting in the cut tree. As such, the determination is “*may impact individuals*”, but those impacts are *not likely to result in a trend toward federal listing or loss of viability*. This determination is based on the fact that these species may be roosting with non-volant young in cut or nearby trees during the harvest period and could be impacted.

3.8 Soil Productivity

This section of the EA summarizes how the proposed Fourmile Vegetation Management project would affect long-term soil productivity. The more detailed resource report is located in the project record. Activities associated with timber harvest, mechanical site preparation, prescribed fire, and road construction in this proposal would result in measurable soil disturbance, but total detrimental soil disturbance would be well under acceptable thresholds. The soil type(s) for each proposed treatment area are assigned a rating of potential risk using criteria-based interpretations derived from standard soil rating criteria.

The effect to soil is measured by estimating the percentage of a treatment area that would be traveled by heavy equipment and the potential for that affected area to be compacted, rutted, displaced, or eroded. The potential effects from nutrient loss after tree bole removal and prescribed fire are estimated. These estimates include consideration of soil resource protection measures that are known to control the extent and duration of disturbance. The estimated percentage of detrimental disturbance per treatment area was compared to the measurement standards and threshold values dictated by the Eastern Region of the Forest Service to determine when soil disturbance effects are unacceptable (limits of change for soil properties are exceeded and result in major changes to soil quality and productivity). Previous impacts of management on these same areas were considered to determine cumulative effects.

The soil resource on more than 99 percent of the project areas is currently in good condition and soil properties are well within their natural range of variability. Soils on project sites pose a low risk potential for detrimental disturbance from the conventional ground-based logging, mechanical site preparation, prescribed fire, and road construction activities proposed. The project would adhere to Forest Plan standards and guidelines and resource protection measures for specific soil types, eliminating or minimizing potential adverse soil resource impacts. At most, an additional 1 to 2 percent of the soil resource in the harvest treatment areas would sustain long-term detrimental impacts from proposed activities. About 97 percent of the treatment areas would remain in a non-detrimentally disturbed condition, which meets National and Regional soil quality standards.

Based on findings of minimal direct and indirect effects from soil compaction, rutting, erosion, displacement, or nutrient loss, the action alternative – Alternative 2 – would not impair the long-term productivity of the treatment areas proposed or any adjacent areas.

The effects of implementing one of the alternatives, when added to the effects of past, present, and reasonably foreseeable actions would not be expected to result in appreciable adverse cumulative effects to the quality of the soil resource in the project area. These determinations are based on the best available science, including: literature reviews; peer reviews; and ground-based observations.

Table EA-8. Summary of direct, indirect, and cumulative soil detrimental disturbance

Soil Resource Impacts	No Action Alternative Acres (%)	Action Alternative Acres (%)
Total treatment Area	0	11,803
Direct and indirect long-term detrimental disturbance (predicted)	0	236 (2)
Past detrimental disturbance	60 (0.5)	60 (0.5)
Cumulative detrimental disturbance	60 (0.5)	296 (2.5)
Long-term productive soil resource	11,900 (>99)	11,507 (>97)

3.9 Water Resources

This section of the EA summarizes how the proposed Fourmile Vegetation Management project would affect aquatic resources. The more detailed resource report is located in the project record. Activities associated with mechanical operations for timber harvest, in addition to permanent road construction, road re-construction, and road decommissioning, would not impair long-term water quality.

Harvest area thresholds for peak snowmelt and storm flow runoff were identified using existing research regarding the effect of aspen clearcutting on stream flows in the Lake States. The analysis indicates that adverse impacts to hydrology and water quality are unlikely as a result of the proposed aspen clearcuts in Alternative 2. The two selected watersheds located within the project area do not approach the thresholds for peak flows of snowmelt or rainfall runoff.

Geographic Information System (GIS) was used to identify and calculate the total acreage of proposed treatment areas (by type) that are located within riparian management zones (RMZs). One hundred feet is the largest riparian management zone (RMZ); designated trout streams, (regardless of width), streams three feet wide and wider, as well as lakes have a 100 foot RMZ, while streams less than three feet wide and streams less than one foot wide have a 35 foot RMZ. The RMZ widths used in this analysis are identified in Wisconsin's Forestry Best Management Practice's (BMP) for Water Quality where management practices can be modified to protect water quality, fish, and other aquatic resources (WDNR 2010). In summary, Alternative 2 proposes up to 105 acres of RMZ harvest treatments where the desired future condition of the stand is to promote the growth and retention of long lived tree species appropriate to the site. In some stands where natural regeneration may be difficult, riparian underplanting of long-lived species would be an associated treatment.

In Alternative 2, decommissioning of up to 0.03 miles of road located in RMZs, 2.33 miles in wetlands, and one stream crossing removal would help to improve hydrologic functions by reducing sediment inputs and the potential effects from off-road vehicle use.

Based on the findings of minimal direct and indirect effects on water quality, the effect to water quality from proposed activities would not impair long-term water quality. These assumptions are based on the findings of past timber sales where the ground cover is maintained by residual vegetation and logging slash, and in areas where the soil is exposed, re-vegetation typically occurs fairly quickly (USDA Forest Service 2001). In addition, since 1995, BMP monitoring has been completed across various land ownerships (State, County, Federal, and Industrial/ Private Lands to evaluate the success of the program. Overall, Federal sales monitored indicated that 95% of the time, BMPs were applied correctly where needed; see Appendix D *Implementation and Effectiveness of Wisconsin's Forestry Best Management Practices for Water Quality on the Chequamegon-Nicolet National Forest, 1995-2014*. Project design features, which include

BMPs, when properly implemented, would ensure that project activities would *not* cause long-term impacts to water quality.

3.10 Air Quality

The proposed prescribed burning has very little potential to affect air quality. A burn management plan would be prepared and the burns would be conducted in such a way as to protect public safety, health, and other resources. The burning would be limited to days with good smoke dispersal. Given the extent, intensity, and duration of the prescribed fire and smoke emissions, the effects would be minimal.

3.11 Transportation and Public Access

Public comments were received concerning the transportation system in the project area. Some publics are concerned that additional road access would negatively impact their National Forest experience, while others would like to see more road access to the National Forests. These comments were not considered as issues because the project area is extensively roaded; only short, scattered segments of road would be decommissioned; and the approximately 147.2 miles of new road decommissions (of which 146.9 miles are already closed to public access) are proposed to protect natural resources. Also, many of the transportation changes are mirroring the access displayed on the 2018 Motorized Vehicle Use Map (MVUM); in other words, the map designated access hasn't changed much, but the on-the-ground conditions are being altered to reflect what the public map displays.

3.12 Climate Change

Climate change is being addressed at all levels in the Forest Service, as well as outside of the Forest Service at a global scale. The Forest Service is working with other agencies and scientists to develop strategies for addressing climate change. One effort, "The Eastern Region Climate Change Strategy", is conducted within the broad structure of an interagency Global Change Research Program authorized by Congress and the President. It is tiered to the Forest Service strategies for climate change and climate change research (USDA FS, 2008b). Another more local effort, the "Climate Change Response Framework at Chequamegon-Nicolet National Forest", will serve as a model for climate change adaptation and mitigation for national forests both regionally and nationally. This has been underway since 2009 (USDA FS, 2009a). Much additional information regarding the strategies, research, and monitoring that is underway in regard to forest sustainability and restoration through adaptation and mitigation is available on the internet at https://www.nrs.fs.fed.us/atlas/tree/tree_atlas.html.

Two key strategies for addressing climate change include "adaptation" and "mitigation". Adaptation relates to the ability of a system to adjust to climate change, be resistant and resilient to potential damages, and to take advantage of opportunities or cope with consequences. Adaptation can be addressed at the project level. Mitigation includes strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks. There are, however, management activities that can affect the carbon balance of the Chequamegon-Nicolet National Forest. Mitigation is best addressed at a much larger scale than the project level for two reasons. The first reason is because project level effects (positive or negative) on the global concentration of carbon dioxide or other greenhouse gases are very difficult to measure at this scale.

The second reason is the boundaries of analysis of mitigation measures extend well beyond the Chequamegon-Nicolet National Forest. Substitution of wood products for fossil-fuel-intensive materials and replacement of woody biofuels for fossil fuels are just two examples. A full

analysis of greenhouse gas mitigation effects of these activities would be complex and broad and would minimally inform the Responsible Official's decision that needs to be made for the Fourmile project. A mitigation assessment, including analysis of many different management scenarios, is currently underway by Forest staff and scientists from the Forest Service's Northern Research Station and the University of Wisconsin. The analysis will include the entire Northwoods of Wisconsin. This work will help us better quantify the mitigation gains and/or losses of a variety of measures and management actions for future projects.

The Forest Adaptation Resources Workbook (Janowiak et al. 2012, PR. Vol. 5.10 Doc.14) was used to consider the impacts of climate change on the project. This publication was used to consider a variety of adaptation actions that may be needed for the project's purpose and need. The team concluded that the actions associated with the purpose and need for the project, as well as those required by the Forest Plan, already provide the necessary adaptation needs. For example, Fourmile project needs are designed to promote resistance to extreme weather and insect and disease outbreaks by increasing stand diversity in terms of species, structure, and tree ages; and increasing stand growth and vigor by providing space for trees to grow. Another adaptation strategy is the reduction of hazardous fuels in the wildland-urban interface. This is a proactive approach to protecting forests from the potential effects of catastrophic wildfire. Adaptation actions are also addressed through project design features, Forest Plan standards and guidelines, and other ongoing activities on the Eagle River-Florence District, including the protection and enhancement of habitat of threatened and endangered species and Regional Forester sensitive species, non-native invasive species control, and restoration of native plant communities.

The Chequamegon-Nicolet National Forest has produced several internal reports and contributed to multiple publications that evaluate the relationship between carbon and forest management (Quinn 2009, Peckham et al. 2013; Birdsey et al. 2014). The Chequamegon-Nicolet National Forest is very fortunate to have a good understanding of the Forest's biological and industrial carbon budget based on recent and locally based research (Fassnacht and Gower 1997, Cook et al. 2004, Desai et al. 2005, Noormets et al. 2007; Birdsey et al. 2014; Ryan et al. 2010; Swanston et al. 2011). Some of the most significant studies of forest carbon budgets have occurred on the Chequamegon-Nicolet National Forest. Birdsey et al. (2014) published a report summarizing the past and prospective carbon stocks on the Chequamegon-Nicolet National Forest and across Northern Wisconsin. White et al. (2005) and Gower and Ahl (2006) calculated the industrial carbon cycle, including all the emissions associated with timber harvest, transportation and processing and concluded that even with current harvest levels, the Chequamegon-Nicolet National Forest is acting as an overall carbon sink. This means that more carbon (or carbon dioxide) is stored than is emitted on the Chequamegon-Nicolet National Forest. Additionally, other studies show that we can expect a net reduction in greenhouse gas emissions from substituting timber products for other materials (for example, cement, steel, and heating fuel that consume more fossil fuels to produce than wood).

In short, the proposed vegetation management actions are not expected to result in a net increase in greenhouse gas emissions, but when substitution effects are anticipated, they could result in a small offset of other global carbon emissions.

3.13 Cultural Resources

This section summarizes the steps that have been taken to ensure that significant/eligible, or potentially significant/potentially eligible cultural resources within the broader boundaries of the Fourmile Vegetation Management project area would be protected. The process of locating and protecting cultural resources in areas of proposed federal undertakings was completed in accordance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C.

470(f)), as amended, and implementing direction provided in 36 CFR 800, Protection of Historic Properties. This direction is further documented in the Chequamegon-Nicolet National Forest 2004 Land and Resource Management Plan.

This report does not represent a true analysis of potential, or cumulative, effects on cultural resources, but rather summarizes how the Forest Service would ensure that all known cultural resources within the project's overall boundary, and more specifically the Area of Potential Effect (APE), are to be protected. It further presents guidance regarding how cultural resources would be treated, should any be inadvertently discovered through project-related implementation activities.

Numerous cultural resources have been identified within the greater Fourmile Project area. Many are currently listed on the National Register of Historic Places (NRHP), many more have been found eligible (barring formal nomination), while still more remain unevaluated.

All known cultural resources that are Listed, Eligible, or unevaluated for the NRHP are to be protected through full avoidance. So long as this requirement is held to, this project would potentially have no adverse effect.

All areas that may be affected by the Fourmile project have been inventoried through cultural resource surveys. Reports for many of these surveys have been submitted to the Wisconsin State Historic Preservation Officer (SHPO) for review and comment. With the completion of surveys, the development of protective measures for each recorded cultural resource, stipulations developed for the treatment of unanticipated discoveries, and eventual completion of required and appropriate consultation efforts, the Forest Service would effectively have satisfied all provisions of 36 CFR 800, Protection of Historic Properties.

With a finding of no potential to cause effect, the Section 106 process would be effectively fulfilled per 36 CFR 800.3(a)(1) and a final NEPA decision can move forward per 36 CFR 800.1(c). During the project planning phase, appropriate consultation efforts should include general public scoping, official government to government Tribal Consultation, and formal consultation with the Wisconsin State Historic Preservation Officer.

Unanticipated Discoveries

In the event that previously unreported cultural resources are encountered during project-related activities, all work must immediately cease within 30 meters (100 feet) and Forest archaeological staff shall be notified. Once Forest archaeological staff have documented the discovery and evaluated its eligibility for the NRHP in consultation with the Forest Archaeologist, SHPO, and Tribes, as appropriate, work may resume in this area.

If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 meters (100 feet) of the discovery. Forest archaeological staff, SHPO, and appropriate Tribes shall be notified of the discovery within 24 hours. All discoveries would be treated in accordance with NAGPRA (Public Law 101-601; 25 U.S.C. 3001-3013), and work shall not resume in this area without authorization from the Forest Archaeologist.

CHAPTER 4 – CONSULTATION AND COORDINATION

Chequamegon-Nicolet National Forest Interdisciplinary Team Members

<p>Dan Reynolds Title: Timber Management Assistant Experience: Forest Service, 13 years Degrees: B.S. Forestry Contribution: Timber & Transportation Input</p>	<p>Tim Ketelboeter Title: Engineering Technician Experience: Forest Service 5 years Degree: AS, Land Surveying Contribution: Transportation Analysis</p>
<p>Adam Felts Title: NEPA Coordinator Experience: Forest Service, 12 years Degrees: B.S. Forestry, M.A. Public Administration Contribution: ID Team Leader, Writer/Editor</p>	<p>Scott Anderson Title: Wildlife Biologist Experience: Forest Service, 22 years Degrees: B.S. Wildlife Management Contribution: RFSS Wildlife BE</p>
<p>Scott Linn Title: Fire Management Officer Experience: Forest Service, 17 years Degrees: B.S. Forest Management Contribution: Fuels Specialist Report</p>	<p>Justin Bournoville Title: District Plant Ecologist Experience: Forest Service, 4 years; USDA ARS, 2 years; USDA NRCS, 1 year Degree: B.S. Biology (Botany Emphasis) & Forest Management Contribution: RFSS Plant BE & NNIS Report</p>
<p>Mark Farina Title: Forest Soil Scientist Experience: NRCS-MI, 1998-2015; Terrestrial Ecological Land Classification Contractor, 2006-2015; NPS Soil Inventory Contractor, 2006-2015; FS Forest Soil Scientist, 2015-present Degrees: B.S. Soil Science Contribution: Soils Specialist Report</p>	<p>Sara Sommer Title: Watershed Specialist Experience: Forest Service, 15 years Degrees: B.S. Natural Resources/ Soil Science and Water Resources Contribution: Aquatic Resource Report</p>
<p>Katie Theisen Title: Silviculturist Experience: Forest Service, 11 years Degree: B.S. Forestry Contribution: Vegetation Resource Report</p>	<p>Chad Kirschbaum Title: Eagle River-Florence District Ranger Experience: Forest Service 15 years (Silviculturist, Timber Management Assistant, Botanist, Forestry and Biological Science technician); Botanist Sand County Foundation and University of Michigan Herbarium Degree: M.Sc. Ecosystem Ecology and Plant Systematics; B.S. Forest Management Contribution: Responsible Official</p>

Evan Miller Title: Assistant Ranger of Recreations\ Experience: Recreation Specialist, 15 Years Degree: Forestry Administration and Utilization w/ Business Administration Contribution: Visual/Recreation Resource Report	Jerry VanCleve Title: Forest Silviculturist Contribution: Silviculture Report Review
Kim Potaracke Title: Archeological Technician Contribution: Heritage Survey Coordination	Christopher Houlette Title: Assistant Forest Archaeologist Contribution: Heritage
Daniel Eklund Title: Forest Wildlife Biologist Contribution: BE Review	Linda Parker Title: Forest Ecologist Contribution: BE Review
Deb Veen Title: GIS Specialist Contribution: Maps, GIS analyses	Kristine Vollmer Title: Forest Environment Coordinator Experience: Forest Service – 33 years (Wildlife, Fisheries, NEPA) Degrees: BS Ecology; MPA Public Admin – Natural Resources Contribution: NEPA Editor

The Forest Service consulted or coordinated with the following individuals; federal, state, and local agencies; and tribes during the development of this environmental impact statement.

Federal, State, and Local Agencies; Individual and Organization Contributors and Commenters

The mailing list of individuals, organizations, and agencies the scoping information package for this project was sent to is in the project record. See EA Appendix C for a list of individuals, organizations, and agencies who commented during scoping (initial scoping), commenting on the proposed action, alternatives, and general effects.

Tribal Governments Consulted

The following tribes and Native American agencies were contacted during the initial scoping period for the project:

- Forest County Potawatomi Community
- Great Lakes Indian Fish and Wildlife Commission
- Keweenaw Bay Indian Community
- Fond du Lac Band of Lake Superior Chippewa Indians
- Lac du Flambeau Band of Lake Superior Chippewa Indians
- Mole Lake Band of Lake Superior Chippewa Indians
- Mille Lacs Band of Chippewa Indians
- Lac Vieux Desert Band of Lake Superior Chippewa Indians